

stork. When daylight broke we could see that the sea was strewn with the bodies of birds that had apparently been caught in the gale ashore and had been carried out to sea. When the gale furiously recommenced at 5 a. m., it blew from the north. As the day wore on it turned slowly to the westward. We subsequently learned that the gale had passed over Frontera, and had done some damage farther south on the isthmus. The gale was over by the morning of the 8th, when the ship anchored near the Champotan Shoals.

The approach of the storm was indicated by reports from the middle Gulf coast on the morning of the 10th, and by the night of that date the center of disturbance had crossed the Gulf coast line near Mobile, Ala. At this time the storm had lost the hurricane intensity it possessed over the southern Gulf. The lowest barometer reading reported at 8 p. m. of the 10th was 29.72 inches at Mobile, and the maximum wind velocity noted on that date was 42 miles an hour at New Orleans, La. During the 11th the depression deepened, and in the evening the central pressure, 29.48 inches, appeared over southern Virginia and northern North Carolina. During the 12th the storm passed northeastward off the middle Atlantic and New England coasts with evidence of increased strength, and vessel reports show that the gales that attended its passage over the Atlantic were of unusual violence. Morning reports of the 15th from the British Isles showed 24-hour pressure falls of one-half to three-quarters of an inch on the west and north coasts. On the morning of the 16th pressures were below 29.00 inches at stations in the north of Scotland, and the presence of a storm center slightly to the southward of the Orkney Islands was indicated. From this position the disturbance passed eastward over the North Sea.

Ample and timely warnings were issued to all United States ports regarding the course and character of this storm.

A disturbance that appeared over the east part of the Gulf of Mexico on the 25th moved northeastward along the Atlantic coast to New England, where it deepened and caused high winds on the 28th.

On the Great Lakes the severest storm of the month occurred on the 12th and 13th. This storm first appeared as a shallow depression over the central valleys of California on the 10th. During the 10th and 11th the depression moved eastward to the middle Rocky Mountain region and during the 12th it deepened rapidly and passed north of east to eastern Iowa. By the morning of the 13th the center of disturbance had reached the northern part of Lake Huron, with minimum reported barometer 29.22 inches at Alpena, Mich., and wind velocities of 56 miles an hour at Chicago, Ill., and 42 miles an hour at Cleveland, Ohio, and Buffalo, N. Y. During the succeeding 24 hours the storm advanced over the St. Lawrence Valley with maximum wind velocity of 60 miles an hour at Buffalo, N. Y. Vessel interests were fully advised of the approach of the storms referred to.

On the Pacific coast the severest storm of the month occurred on the north coast on the 27th. Storm warnings were hoisted on the Washington coast the morning of the 27th and the wind increased to gale force in the afternoon without, however, causing any damage to shipping.

The most important frosts of the month occurred from the 14th to 16th and from the 28th to the 31st. On the 14th frost was reported in the lower Missouri Valley and in the Mississippi Valley as far south as northern Arkansas. On the morning of the 15th frost was noted generally from the Ohio Valley to central portions of the middle and east Gulf States. On the 16th frost occurred from the central parts of the east Gulf States over the interior of the South Atlantic States. On the morning of the 28th frost was observed in the Middle-western States. By the 29th the frost area had extended over the interior of the middle and east Gulf and South Atlantic States. On the 30th frost occurred in the interior of the east Gulf and South Atlantic States and thence to the North Carolina coast. Frost was also reported on the 31st generally over North Caro-

lina. In regions where crops were subject to damage by frost, warnings were distributed on the days preceding its occurrence.

In California rain warnings were of value to fruit dryers and raisin makers.

At the close of the month there was evidence of a disturbance south of eastern Cuba. This disturbance moved north-eastward over Santo Domingo and the Atlantic Ocean during the early days of November, 1902, and will be discussed in the MONTHLY WEATHER REVIEW for that month.

BOSTON FORECAST DISTRICT.

The storm of the 28th was quite severe along the northern coast, the wind being from east and southeast, and shipping was delayed and some damage resulted. Warnings were displayed well in advance of the storm. The first killing frost of the season occurred on the 22d, and was announced twenty-four hours in advance. Considerable benefit was derived from the warnings.—*J. W. Smith, Forecast Official.*

NEW ORLEANS FORECAST DISTRICT.

Storm warnings were issued for the Louisiana and Mississippi coasts on the 10th and 22d, and both were fully justified. Two vessels were lost in the storm of the 22d. The steamer *Palor City* sunk in the river as a result of the steamer *Natches* being blown against her. A three-masted schooner, the *La Plata*, went aground on the Chandeleur Islands, Miss. Frost, for which warnings were issued, occurred in Arkansas on the 14th, 28th, and 29th.—*I. M. Cline, Forecast Official.*

CHICAGO FORECAST DISTRICT.

The stormy season which set in earlier than usual during September continued through the month of October, with increasing severity. It is probable that the daily forecasts and storm warnings were of great benefit to marine interests, as no important casualties have been reported.—*H. J. Cox, Professor.*

DENVER FORECAST DISTRICT.

With the exception of a frost warning sent to a few points in the extreme southeastern part of Colorado on the morning of the 3d, no special warnings were issued.—*F. H. Brandenburg, Forecast Official.*

SAN FRANCISCO FORECAST DISTRICT.

Rain warnings were issued to fruit dryers and raisin makers throughout the State, and at nearly all points trays were stacked before the rains began. Storm warnings were displayed on the northern California coast on the 21st and 22d. Incoming mariners reported severe weather outside on those dates.—*A. G. McAdie, Professor.*

PORTLAND, OREG., FORECAST DISTRICT.

Frost forecasts were discontinued after the season of danger to crops had passed. Storm warnings were ordered for three disturbances, the most severe of which occurred on the 27th. *E. A. Beals, Forecast Official.*

RIVERS AND FLOODS.

The usual autumnal quiet of the rivers was not disturbed during October except in the Middle and South Atlantic States where there were occasional interruptions of limited duration and extent, caused by the heavy rains that are the almost invariable accompaniments of storms of the southwestern and Gulf of Mexico types. The first was a moderate flood in the James and Roanoke rivers from the 6th to the 8th, inclusive, the result of heavy rains over southern, and particularly over